



## PIER Energy-Related Environmental Research

Environmental Impacts of Energy Generation, Distribution and Use

### Raptor Electrocution on Power Lines: Problem Assessment, Mitigation, and Monitoring

**Contract #:** 500-01-032, subcontract S0146103

**Subcontractor:** Colorado State University

**Subcontract Amount:** \$59,153

**Subcontractor Project Manager:** Robert Lehman

**Commission Project Manager:** Brian Walton

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#### The Issue

In California, avian interactions with power lines not only result in avian deaths and potential hazards from wildfires—a recent study concludes that the “base case” estimate of the cost of wildlife-caused power outages on the California economy is \$34 million each year.<sup>1</sup> Data on raptor electrocutions result primarily from retrospective studies that are based on incidental encounters with dead birds at the site.<sup>2,3</sup> In such studies, it is difficult to standardize and replicate mortality searches or to assess potential biases.<sup>4</sup> Data from these studies obviously do not represent all avian mortalities that occur in California from interactions with power lines, and given the lack of standardized methods, they may not be useful in estimating numbers of birds killed or inferring actual numbers of poles involved in electrocutions.



With no way to measure electrocution mortality or estimate the scale of the problem, many utility companies must make critical decisions about the design of avian protection programs, but

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<sup>1</sup> Energy and Environmental Economics, Inc. 2005. *The Cost of Wildlife-Caused Power Outages to California's Economy*. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2005-030.

<sup>2</sup> Avian Power Line Interaction Committee (APLIC). 1996. *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996*. Edison Electric Institute/Raptor Research Foundation. Washington, D.C.

<sup>3</sup> Lehman, R. N. 2001. “Raptor electrocution on power lines: Current issues and outlook.” *Wildl. Soc. Bull.* 29:804–813.

<sup>4</sup> Bevanger, K. 1999. Estimating bird mortality caused by collision and electrocution with power lines: A review of methodology. Pages 29–56. In *Birds and Power Lines: Collision, Electrocution, and Breeding*. M. Ferrer and G. F. E. Janss, editors. Madrid, Spain: Quercus.

have no means of predicting success. The electric utility industry has a legal obligation to deal with the problem,<sup>5</sup> but lacks tested methods to fully justify extensive, proactive retrofitting.<sup>6</sup>

## Project Description

The PIER Environmental Area is funding work at the University of Colorado that will provide the electric industry with practical recommendations for assessing, mitigating, and monitoring raptor electrocutions. The project will conduct the following activities:

- Estimate and contrast electrocution mortality among selected pole types and within selected habitat and landscape categories.
- Evaluate biasing factors that may influence estimates of electrocution mortality.
- Determine if raptors show preferences for particular poles for perching, and identify landscape features that may influence pole selection.
- Evaluate the effectiveness of retrofitting procedures currently in use to reduce raptor electrocution mortality.
- Evaluate the usefulness of incidental mortality records for monitoring raptor electrocutions.

The study will take place within the service areas of two public utilities, the Moon Lake Electric Association (which provides electrical service in northwestern Colorado and northeastern Utah) and the Idaho Power Company (operating primarily in central and southern Idaho). These companies were chosen because they have implemented power pole retrofits in their service areas for a number of years. Moon Lake has implemented power pole retrofits in its service areas since 1999, and their level of retrofitting (over 50% of all poles in some areas) represents one of the most extensive attempts to date by a utility to reduce raptor electrocutions. Idaho Power began retrofitting power poles in the 1970s and was an early leader in industry efforts to identify the causes of raptor electrocution and develop retrofitting standards.<sup>7, 8</sup>

Like Moon Lake, Idaho Power has focused its retrofitting effort on structures thought to be most lethal and has concentrated effort in areas of high raptor abundance, like the Snake River Birds of Prey National Conservation Area. This protected area occupies approximately 2,400 square kilometers of the Snake River Plain in southwestern Idaho, and supports one of the highest densities of cliff-nesting raptors in the world.<sup>9</sup>

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<sup>5</sup> Suazo, L. R. 2000. Powerlines and raptors, using regulatory influence to prevent electrocutions. Pages 773–778. In *Raptors at Risk: Proceedings of the V World Conference on Birds of Prey and Owls*. Chancellor, R. D., and B. U. Meyburg, editors. Blaine, Washington: Hancock House.

<sup>6</sup> Nelson, M. W., and P. Nelson. 1976. “Power lines and birds of prey.” *Idaho Wildlife Review* 28:3–7.

<sup>7</sup> Ibid.

<sup>8</sup> Ansell, A., and W. E. Smith. 1980. Raptor protection activities of the Idaho Power Company. Pages 56–70. In *Proceedings of a Workshop on Raptors and Energy Developments*. R. P. Howard, and J. F. Gore, editors. Idaho Chapter of the Wildlife Society. Boise, Idaho.

<sup>9</sup> U.S. Department of Interior. 1979. *Snake River birds of prey special research report to the Secretary of the Interior*. Bureau of Land Management. Boise, Idaho.

## PIER Program Objectives and Anticipated Benefits for California

This project offers numerous benefits and meets the following PIER program objectives:

- **Providing environmentally sound and safe electricity.** This study will develop and refine methods to assess the risk posed to raptors by untreated poles and contrasting these results with treated poles to allow for an assessment of the effectiveness of currently used retrofit hardware. With this information in hand, utilities can better decide which types of hardware to use to reduce avian fatalities.
- **Providing reliable electricity.** This research will develop standardized methods that will allow utilities to predict which types of distribution structures pose the highest threat of avian electrocution and what role various environmental factors play in electrocution risk. These methods will enable utilities to predict situations of high risk where they can take proactive measures to reduce the occurrence of power outages associated with avian electrocution.
- **Providing affordable energy services.** This project will develop standardized methods that will enable any electric utility to assess the extent of the problem in its service area, identify which conditions elevate risk, and determine which types of retrofit technologies are useful, so it can focus resources and implement cost-effective solutions.

## Results

Preliminary results were presented in a workshop at the Raptor Research Foundation Annual North American Meeting November 2004. Quantitative data from this study will be archived at the U.S. Geological Survey's Richard R. Olendorff Memorial Library, Snake River Field Station, Boise, Idaho, and at Colorado State University. The data will be provided to all partners, cooperators, and utilities as requested or needed.

## Final Report

Development of a final draft is expected fall 2006. Results will be submitted to peer-reviewed journals fall 2006. Development of a final draft, which will be available on the website, is expected winter 2006. Several manuscripts will also be submitted to peer-reviewed journals.

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